https://doi.org/10.21061/jte.v7i1.a.5

The Relationship Between Psychological Type and Professional Orientation Among Technology Education Teachers

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Technological change in the work force is a critical problem in business and industry, precipitating the quick obsolescence and emergence of job skills and training (Fairhurst, 1990). Cornish (1977) describes the tremendous change that has occurred within our society as convulsive. Change is also perhaps, the most appropriate term to describe the reformation that is currently taking place in the field of technology education. Changes in the goals, activities, instructional methodologies, and types of instructional programs within technology education has caused considerable debate within the profession.

Indeed, the instructional field of technology education has undergone radical changes in past years. Ever since the pioneering curricular efforts of William Warner in the late 1940's technology education has progressively strived to move beyond a product-based curriculum to a more process-based curriculum that strives to encourage and develop higher-order thinking in students (Wicklein, 1993).

The decade of the 1990s promises to bring even more significant changes to the field of technology education. The development of the *Conceptual Framework for Technology Education* (Savage & Sterry, 1991) presented both a theoretical and practical approach to understanding the instructional goals and objectives of technology education. Further, current efforts to develop curricula that integrates technology education with science and mathematics is currently viewed as a significant focus of change for the field (LaPorte & Sanders, 1993; Wicklein & Schell, 1995) that will have serious impact on the field of technology education in the coming years (LaPorte & Sanders, 1993; Scarborough, 1993; Wicklein & Schell, 1995).

The debate over changes that have been made in the field of technology education and the current direction of the field has created a certain degree of

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https://doi.org/10.21061/jte.v7i1.a.5

tension within the profession (Bell & Erekson, 1991; Clark, 1989; Hansen, 1993; Justice, 1986; Lewis, 1992; Schilleman, 1897; Sinn, 1991; Zuga, 1989). Differing and sometimes opposing views regarding the successes and failures of the technology education movement continue to influence the direction and composition of technology education programs. Despite the philosophical changes proposed by the profession, there exist several concerns about acceptance, implementation, and program survival. Without exception, every state has orchestrated some form of technology education however, divergence of acceptance and application continues to pervade the profession at all levels (Rogers, 1992).

The current study investigated the relationship between psychological type and professional orientation among educators in the technology education field of study. Psychological type theory (Myers & Briggs, 1975) provides a construct that explains individual propensities toward favored or natural behaviors and abilities. By understanding psychological type preferences of technology education professionals, we may be able to gain insights into the reasons for specific professional orientation.

Theoretical Framework

Jung's theory of psychological type is one of the most comprehensive theories developed to explain human personality (Lawrence, 1982; Plessman, 1985). Jung (1923) theorized that what appears to be random variation in human behavior is actually quite orderly, logical, and consistent, and is the result of a few basic differences in mental functioning and attitude. These observable differences affect what people perceive, as well as how they draw conclusions about those perceptions (Lamberth, Rappaport, & Rappaport, 1978; Myers, 1980; Myers & McCaulley, 1985; Vogt & Holder, 1988; Weade & Gritzmacher, 1987; Zeisset, 1989).

Jung categorized and explained individual differences in terms of function and attitude. Four basic mental functions (processes) each represent a characteristic way of approaching experience and are considered to be the essence of Jung's personality theory. Each of the four functions - sensing, intuition, thinking, and feeling - involve an individual's orientation toward self and the environment through the use of perception and judgment (Myers & McCaulley, 1985). Jung believed that in order for individuals to function well they must have a way to perceive a stimulus (i.e., perception through sensing or intuition) and to make an adequate response to that perception, i.e., making a decision or judgement through thinking or feeling (Lamberth et al., 1978; McCaulley, 1980).

Perception refers to ways in which an individual becomes aware of things, people, events, or ideas in the environment and is divided into two catego

https://doi.org/10.21061/jte.v7i1.a.5

ries–sensing and intuition. Sensing describes a preference to focus on concrete aspects of a situation by using one or more of the five senses. Alternately, intuition describes the focus of attention on abstract ideas made through possibilities, meanings, and relationships (i.e., hunches) associated with a concrete situation. Judgement is used to describe the way in which a conclusion is reached about that which has been perceived and includes decision making, evaluation, and selection of an appropriate response to a stimulus. Judgement is also divided into two categories - thinking and feeling. Thinking is a function which links ideas together through logical connections and leads to an impersonal finding. Feeling, on the other hand, describes a rational act of evaluation using subjective values and relative merits of the issues (Lawrence, 1982; Myers, 1980; Plessman, 1985; Weade & Gritzmacher, 1987; Zeisset, 1989).

The two attitude types, extraversion and introversion, describe how an individual prefers to engage the environment and use the four basic mental functions. Extraversion and introversion are seen as complementary orientations toward life (Jung, 1923). Extraversion defines the actions of individuals who prefer an orientation to the outer world of people, places, and things. Introversion describes a preferred orientation toward the inner world of thoughts, concepts, and ideas (Lamberth et al., 1978; Lawrence, 1982; Myers & McCaulley, 1985).

Past Studies on Psychological Type

The Keirsey-Bates Temperament Sorter (Keirsey & Bates, 1978) is one of several instruments used to measure personality type preference. Modeled after the Myers-Briggs Type Indicator (MBTI) (Myers & Briggs, 1975), the Keirsey-Bates Temperament Sorter provides a framework for determining predispositions toward favored or natural tendencies in human behavior (Fairhurst, 1990). Based on Jungian psychological theory (Plessman, 1985) both type preference instruments seek to determine how people consciously prefer to attend to the world, how they choose to perceive that to which they attend, and how judgements are made about those perceptions (Lawrence, 1982; Schultz, 1985).

Knowledge of an individual's psychological type preference can have far-reaching implications for understanding and interpreting human behavior (Foster & Horner, 1988). Research has demonstrated that career choice, as well as success and satisfaction with one's chosen career, is often consistent with one's personality characteristics (Plessman, 1985; Vogt & Holder, 1988). Psychological type has been shown to affect how students learn, how teachers teach, how leaders lead, and how everyone works and communicates (Elias & Stewart, 1991; Foster & Horner, 1988). Lawrence (1982) asserted that teachers with distinct personality types were predictably attracted to different levels of teaching and to different subject matter. Howard (1992) has used the MBTI to

https://doi.org/10.21061/jte.v7i1.a.5

measure career issues related to medical career specialties. His research evaluated the effects of personality type differences on education and career guidance, physician well-being and satisfaction, and physician ordering of laboratory tests. Although Howard (1992) indicated varying degrees of criticism regarding inappropriate uses of MBTI, his results provided a strong rationale for use of psychological type preference research in career guidance and planning.

Barrett (1991) evaluated the relationship of observable teaching effectiveness with personality type preferences in teaching vocational-related courses. He found that certain personality styles had greater ease or difficulty in achieving high teaching effectiveness scores. Felder and Silverman (1988) analyzed the teaching and learning styles of engineering professors and their students using the MBTI. Their findings identified that the learning styles of most engineering students and teaching styles of most engineering professors were incompatible on several dimensions. Whereas most engineering students were visual, sensing, inductive, and active, most engineering education centers around auditory, abstract, deductive, passive, and sequential instruction. These researchers summarized that the disparity of instructional and learning preference they observed had created a negative impact on the field of engineering.

In a somewhat similar analysis, McCaulley (1976) evaluated 3,867 college students to determine psychological type preference using the MBTI. A subset of this student sample was comprised of 194 engineering majors. McCaulley sought to determine whether certain psychological types were significantly interested or uninterested in specific engineering specialties. Overall analysis revealed that 62% of engineering majors were classified as introverts (I), 52% preferred a sensing (S) approach to perceiving and learning, 59% preferred an analytical or thinking (T) approach to decision making, and 60% preferred a judging (J) classification pertaining to applying decisions to specific environments. This type profile differed from the total student sample who displayed the following psychological type preferences: 52% extroversion (E), 53% intuition (N), 63% feeling (F), 50% judging (J) and 50% perceptive (P) preferences.

Differences in the type preferences of engineering majors compared with non-engineering majors are one indicator of the impact that psychological type preference has on career choice. McCaulley (1976) postulated that the premise of type theory on predicting attainment of career satisfaction is based on the following criteria:

1. Individuals finding occupations whose tasks require them to use their preferred styles of perception and judgment in the attitudes they prefer, so that the tasks have intrinsic interest and satisfaction;
2. High standards constantly challenging them to develop their powers, so that they continue to grow in the excellence of their type;
3. Individuals that are also required to “go against the grain” from time

https://doi.org/10.21061/jte.v7i1.a.5

> to time, so that they develop those aspects of their personalities not yet perfected. (p. 735)

McCaulley's application of psychological type theory may have a significant influence on the field of technology education as the profession changes in scope and purpose.

Edmunds & Schultz (1989) sought to determine the psychological type groupings of secondary-aged students in Nebraska who were enrolled in industrial arts classes, and compared these groupings with established norms for a high school population. Additionally, they sought to determine the career and educational plans of the group when compared to psychological type preferences. Their analysis identified that a disproportionate number (60%) were classified as having a preference for sensing and thinking (ST) dimensions. Based on psychological type profile and career and educational plans, Edmunds and Schultz recommended that a traditional industrial arts curriculum was appropriate for most students. Unfortunately, this recommendation does not consider a number of competing issues (e.g., instructional standards, student accessibility, workforce needs).

Purpose and Objectives of the Study

Given the potential that psychological type may have on the teaching-learning process and current discussion regarding orientation of industrial-technical studies, the present study sought to examine psychological type of technology education professionals. Specific research objectives included:

1. Describe psychological preferences of technology educators and industrial arts educators using Myers-Briggs Type Indicator personality profiles and Keirsey-Bates temperament type.
2. Compare psychological type profiles of technology and industrial arts educators using the Keirsey-Bates temperament typology. Compare these results with norms established for the general population and for secondary educators.

Methods

Participants

This investigation examined the psychological type preference of secondary industrial arts and technology educators. Members of the International Technology Education Association (ITEA; *N*=6500) were used to construct an accessible sampling frame. ITEA is an international organization with a mission to promote excellence in technology teaching and works to increase the effectiveness of educators to empower all people to understand, apply, and assess technology. A stratified random sampling procedure was used to obtain a pro-

https://doi.org/10.21061/jte.v7i1.a.5

portionate number of respondents from each of the four ITEA regions. First, the percentage of technology professionals in each region, in relation to the total population, was calculated. Then, a subset was randomly selected from each region to reflect the varying contributions of regional representation to the total. Sample size was determined at a 90% confidence level using standards reported by Krecjie and Morgan (1970) and Nunnery and Kimbrough (1971).

A total of 254 questionnaires were returned from the final research sample. In terms of professional orientation, slightly more than one-half of respondents were identified as technology educators (*n*=136), while most of the remainder (*n*=110) were considered industrial arts educators. Eight respondents were undecided about their professional orientation. For purposes of this study, this small undecided group was excluded from further analysis, leaving a final sample size of 246.

The final sample contained more males (*n*=199) than females (*n*=47) and was predominantly White (81.3%). Half of all participants were between the ages of 39 and 52 years (*M*=45.5 years). Comparable number of respondents were represented from ITEA Region 1/Eastern(*n*=72), Region 2/East Central (*n*=65), and Region 3/West Central (*n*=70); however a smaller number of participants represented Region 4/Western (*n*=27). Participants reported working in urban (29.3%), rural (30.5%), and suburban settings (35.8%). The sample possessed a high level of education with three-fourths of all respondents (*n*=185) holding graduate-level (master's or doctoral) degrees. Years of teaching experience ranged from 1 to 42 years, averaging 20.23 years (*SD*=9.72). Respondents who reported current teaching duties held assignments in middle school (n=61), senior high school (*n*=116), and college/university settings (*n*=52).

Instrumentation

Self-report questionnaire. Individuals selected for participation in this study were mailed a two-page questionnaire which included the Keirsey-Bates personality profile instrument. The self-report questionnaire was divided into three main sections. The first section asked for demographic information including gender, age, race, years of teaching experience, location of school (*i.e.*, rural, suburban, or urban), grade levels taught (if applicable), and highest educational degree attained.

The second section of the questionnaire requested information regarding the type of technology education program taught or administered. Respondents were asked to indicate types of learning activities, identify appropriate program philosophies and descriptions, determine major instructional program goals, and specific pedagogical methodologies used in their classrooms. Respondents were subsequently categorized according to their professional orientation

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(technology education vs. industrial arts education) in the following manner. A designation of technology education was assigned for classroom activities such as desktop publishing, applied physics, and impacts of technology; a program philosophy reflecting an emphasis on communication, production, transportation, bio-related technologies, and technological impacts on society; program goals that include application of knowledge about the dynamics of technology to solve technical problems and extend human potential; and instructional methods like the use of discovery, inquiry, and experimentation. On the other hand, industrial arts educators were those who noted woodworking, drafting, and sheet metal as classroom activities; placed an emphasis on material usage and tool development skills with instruction centered on student project formation as their program philosophy; declared that student ability to understand the world of work through project construction and development of prevocational skills was a major program goal; and relied on formal presentations and laboratory demonstrations as a major focus of their instructional methods. These guidelines were compiled from Dugger, French, Peckham, & Starkweather, (1991, 1992), Kemp & Schwaller (1988), and Ritz (1992) and generally have wide consensus in the field of technology education and industrial arts education.

The third section on the questionnaire contained the Keirsey-Bates Temperament Sorter (KBTS; Keirsey & Bates, 1984) which was selected as the instrument for determining psychological type. The KBTS, along with the Myers-Briggs Type Indicator, are among several instruments that can be used to measure personality type preference and are based on the work of Jung (1923). The KBTS is a 70-item forced-choice questionnaire designed to elicit an individual's preference on four dichotomous scales or dimensions, similar to those originally designed for the Myers-Briggs Type Indicator (MBTI; Myers & Briggs, 1975). Both the MBTI and KBTS allow separate indices for the four basic preferences of extraversion (E)–introversion (I), sensation (S)–intuition (N), thinking (T)–feeling (F), and judging (J)–perception (P) (Foster & Horner, 1988; Plessman, 1985). Specific relationships between the four dichotomous scales lead to descriptions and characteristics for 16 separate psychological types (Myers & McCaulley, 1985). Personality types are expressed by a four-letter composite that represents an individual's preference on each of the four indices. The four personality dimensions, based on Jung's attitude (extraversion and introversion) and functions (perception and judgment) are:

EI Index: **Extraversion (E)** Active involvement with people as a source of energy. Perception and judgment are focused on people and things. **Introversion (I)** A preference for solitude to recover energy. Perceptions and judgment are focused on concepts and ideas. Seventy-

https://doi.org/10.21061/jte.v7i1.a.5

five percent of the general population prefer an extraverted orientation, while twenty-five percent prefer an introverted one.
SN Index: **Sensing (S)** Receiving or gathering information directly through use of the five senses. **Intuition (N)** Perceiving things indirectly, through hunches or a "sixth sense." Represents the unconscious incorporation of ideas or associations with outside perceptions. Three-fourths of the general population report a sensing preference, while the remaining one-fourth prefer intuition as a means of perceiving and gathering information.
TF Index: **Thinking (T)** Drawing conclusions based on logical process using impersonal and objective facts. **Feeling (F)** Drawing conclusions based on personal values and subjective observations. The general population is divided equally between a preference for thinking (50%) and feeling (50%).
JP Index: **Judgment (J)** A preference to live in a structured, orderly, and planned fashion. **Perception (P)** A preference to live in a more spontaneous and flexible fashion. Fifty percent of the general population report to be judging, while the other half report a preference for perception (Foster & Horner, 1988; Keirsey & Bates, 1984; Lawrence, 1982; Myers, 1980; Myers & McCaulley, 1985).

Keirsey and Bates (1984) have taken the MBTI typology and used it to examine Jungian psychological preferences known as temperament types. While the MBTI uses 16 psychological types, Keirsey and Bates have categorized observed behavior into four broad temperament groups; sensing and judging (SJ), sensing and perceptive (SP), intuitive and thinking (NT), and intuitive and feeling (NF) (Barrett, Sorenson, & Hartung, 1987). These specific combinations of Myers-Briggs' dichotomous indices were selected to mirror four temperament groups proposed by past researchers.

Keirsey and Bates (1984) viewed their four temperament types as the base for the 16 Myers-Briggs psychological types and felt that each of the 16 psychological preferences could be categorized into one of the four temperament types. They held this view even though temperament types were described some time after the development of the Myers-Briggs typology (Barrett, 1985). Research has shown that SP and SJ temperaments each represent approximately 38% of the general population, while NT and NF temperament types each represent roughly 12% of the general population (Keirsey & Bates).

Design and Procedure

A total of 600 members of ITEA were randomly sampled from the accessible sampling frame. Each member of the sample was mailed a one-page cover

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letter, questionnaire, and a pre-addressed postage paid envelope during the Fall of 1992. A follow-up mailing was made for those not responding to the initial survey request after a 3-week waiting period. Responses were collected for an additional 3-week period at which time data collection ceased. This procedure resulted in a total of 246 usable questionnaires being returned for a response rate of 41%. While the response rate was not as high as was hoped, it was considered acceptable given Fowler's (1988) declaration that samples larger than 150 typically did not change the degree of generalizability of the sample to the population. Response rate may have been low for several reasons - perhaps the most plausible explanation is the length of the KBTS (although not exorbitantly long, it did take approximately 15 minutes to complete). Further, no response bias was detected from a comparison of early and late respondents. Whipple and Muffo (1982) demonstrated that late respondents are similar to nonrespondents in terms of questionnaire completion. Therefore, the researchers concluded that the number returned would be representative of the entire sample.

Results

One goal of this investigation was to describe the personality and temperament types of technology and industrial arts educators. An overall distribution of respondents on the 16 MBTI personality types revealed a higher prevalence of the personality type preferences ESTJ, ENTJ, ENFJ, ISTJ than that found in the general population. In contrast, the personality types ESTP, ESFJ, and ESFP were lower than found in the general population. When professional orientation was considered, a higher proportion of industrial arts educators reported an ESFJ or ISFJ type than technology educators. Technology educators had a higher percentage of ENTJ, ENFJ, and ENFP personality profiles than their counterparts (see Table 1).

MBTI personality types are composed of an individual's preference from each of the four type components or dimensions (extraversion-introversion, sensing-intuition, thinking-feeling, judgment-perception). The distribution of educators within each of these four type dimensions (see Table 2) revealed two significant relationships between educators on the basis of professional orientation. Chi-square analysis indicated that technology educators preferred extraversion on the EI dimension, $X^2(1, N=219)=4.04$, $p<.05$, and were more intuitive than their industrial arts counterparts on the SN dimension, $X^2(1, N=228)=20.95$, $p<.001$. No significant relationships were found between teacher preferences for thinking or feeling on the TF index, $X^2(1, N=237)=.0692$, *ns*; or for judgment or perception on the JP dimension, $X^2(1, N=233)=.278$, *ns*.

https://doi.org/10.21061/jte.v7i1.a.5

Table 1
Distribution of Technology and Industrial Arts Educators by MBTI Type

MBTI Type	All Participants (*n*=194)[a]		Technology Educators (*n*=105)		Industrial Arts Educators (*n*=89)		General Population
	n	(%)[b]	*n*	(%)	*n*	(%)	(%)
ESTJ	60	(30.9)	30	(28.6)	30	(33.7)	13
ESTP	2	(1.0)	2	(1.9)	0	(0.0)	13
ESFJ	15	(7.7)	4	(3.8)	11	(12.4)	13
ESFP	1	(0.5)	0	(0.0)	1	(1.1)	13
ENTJ	25	(12.9)	17	(16.2)	8	(9.0)	5
ENTP	9	(4.6)	6	(5.7)	3	(3.4)	5
ENFJ	23	(11.9)	17	(16.2)	6	(6.7)	5
ENFP	9	(4.6)	8	(7.6)	1	(1.1)	5
ISTJ	26	(13.4)	12	(11.4)	14	(15.7)	6
ISTP	1	(0.5)	0	(0.0)	1	(1.1)	6
ISFJ	12	(6.2)	3	(2.9)	9	(10.1)	6
ISFP	2	(1.0)	0	(0.0)	2	(2.3)	6
INTJ	5	(2.6)	3	(2.9)	2	(2.3)	1
INTP	1	(0.5)	0	(0.0)	1	(1.1)	1
INFJ	1	(0.5)	1	(0.9)	0	(0.0)	1
INFP	2	(1.0)	2	(1.9)	0	(0.0)	1

[a]A total of 52 respondents were tied on one or more MBTI dimension and are not included in this table (technology orientation, *n*=31; industrial arts orientation, *n*=21).

[b]Percentages represent share of all respondents who stated a preference (*n*=194)and are rounded to the nearest full point. Totals may not equal 100 % due to rounding error.

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Table 2
Percentage of Respondents in MBTI Type Components by Professional Orientation

	Personality Factors[a]															
		E		I		S		N		T		F		J		P	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n
All Respondents	246[b]	74	182	26	64	60	148	40	98	67	165	33	81	88	216	12	30
Technology Orientation	136	79	107	21	29	46	63	54	73	66	90	34	46	86	117	14	19
Industrial Arts Orientation	110	67	74	33	36	77	85	23	25	69	76	31	34	89	98	11	12
High School Teachers[c]		70		30		70		30		50		50		55		45	
General Population[d]		75		25		75		25		50		50		50		50	

[a]Components of MBTI personality type: E=extraversion, I=introversion, S=sensing, N=intuitive, T=thinking, F=feeling, J=judgement, P=perception.
[b]Missing data reflects those participants who did not show a preference for one of the two components on a particular dimension.
[c]Type component data for high school teachers taken from Lawrence (1982), included for comparative purposes.
[d]Type component data for the general population taken from Keirsey and Bates (1978) and Barrett (1985), included for comparative purposes.

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Data were also analyzed according to Keirsey-Bates' temperament type groupings (see Table 3 for type distribution). Overall, the largest represented temperament type was that of sensing-judging (SJ=57%) followed by intuitive-thinking (NT=21%), intuitive-feeling (NF=19%), and sensing-perceptive (SP=3%). A Chi-square analysis was performed to determine if this profile was independent from that of the general population. Results found that, as a group, technology educators reported a stated preference for an SJ temperament and held a lower preference for an SP temperament, $X^2(3,N=224) = 117.00$, $p<.001$. Possible relationships between technology and industrial arts educators were also examined. Chi-square analysis indicated a significant relationship in preferred temperament types on the basis of professional orientation, $X^2(3, N=224)=22.31$, $p<.001$. In this sample industrial arts educators stated a greater preference for a sensing-judging (SJ) temperament type, while technology educators reported greater preferences for intuitive-thinking (NT) and intuitive-feeling (NF) temperament types.

Table 3
Percentage of Respondents in Four Temperament Types by Professional Orientation

		Temperament Types[a]			
		SP	SJ	NT	NF
	n	Percentage(s)			
All Respondents	246[b]	3.0	57.0	21.0	19.0
Technology Orientation	136	1.5	41.9	24.3	25.0
Industrial Arts Orientation	110	4.6	63.6	13.6	7.3
General Population[c]		38.0	38.0	12.0	12.0

[a]Components of temperament type: SP=sensing-perceptive; SJ=sensing-judging; NT=intuitive-thinking; NF=intuitive-feeling.
[b]Missing data (n=22) (TE: n=10 (7.4%); IA: n=12 (10.9%) was unable to be calculated due to uncertain preference in one or more KTBS dimensions.
[c]Type component data in the general population taken from Kiersey and Bates (1978), included for comparative purposes only.

https://doi.org/10.21061/jte.v7i1.a.5

Discussion

This study found a relationship between professional orientation and psychological type preference. Industrial arts educators were more likely to prefer introversion, sensing, and judging orientations while technology educators indicated a preference for extroversion, intuition, and feeling orientations. A brief examination of these relationships are offered in the remainder of this section.

Four MBTI personality types -- ESTJ, ISTJ, ENTJ, and ENFJ -- accounted for 69% of all technology professionals included in this study. Individuals with an ESTJ or ISTJ psychological type (accounting for 44% of the sample) are often described as being practical and realistic. These individuals tend to solve problems in a more concrete fashion, relying on past experiences. These individuals also prefer organization and structure. This profile described industrial arts educators a significantly greater portion of the time. This finding supports past studies that examined psychological type for students and educators who maintain an industrial arts orientation (Edmunds & Schultz, 1989; Rojewski & Holder, 1990).

In contrast, ENTJ and ENFJ psychological types prefer to solve problems conceptually through structured investigation and inquiry. These personality types rely more on intuition and the consideration of multiple possibilities when solving problems than other types. They tend to be structured and organized, yet a general concern for others is often evident. This second profile was more representative of technology educators.

Does personality preference manifest itself in the philosophical differences espoused by industrial arts and technology educators? Can psychological type be used as a means of understanding different and, sometimes, opposing views toward recent developments in secondary technology education curriculum and instruction? The authors believe that the results of this study can shed some light on these questions. Today, the content of technology education curricula is more geared toward learning cognitive processes (*e.g.*, problem-solving, analyzing, modeling, experimenting) than is evident in industrial arts courses which tend to concentrate on technical skill development. Results of this study help to explain the conceptual orientation of technology educators toward curriculum development and program goals. Likewise, the focus of industrial arts curriculum on the physical and concrete nature of work can be partially understood by taking psychological type into account.

Findings of this study are generally consistent with prior research involving individuals in technical fields (Edmunds & Schultz, 1989; McCaulley, 1976; Rojewski & Holder, 1990). Lawrence (1982) hypothesized that educators with a high sensing (S) preference often teach practical courses, whereas individuals preferring intuition (N) choose theory-based courses. The findings of this research supported this hypothesis.

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Conclusion

Several implications for practice emerge from the findings of this study. First, awareness of differing preferences for industrial arts and technology educators will help promote understanding throughout the profession (*i.e.,* professionals will have a partial understanding of how opposing views have developed and what they represent). This understanding will provide a basis of need for the continued expansion of program development. Specifically, technology education programs will attract individuals in greater numbers that prefer conceptual approaches to problem solving, critical thinking, and creativity. Their instructional activities will be geared more to the development of the mental processes and methods of inquiry for their students and less on specific technical skill development. Professionals within the field need to make a concerted effort to inform the public with regard to the changes in program goals and objectives and to energetically recruit individuals from non-traditional technology education/industrial arts backgrounds (i.e., artistic, enterprising, and social types vs. conventional, realistic, and analytical types). The profession needs an infusion of enthusiastic, creative, intelligent individuals who can approach the study of technology from the "big picture" or a more holistic perspective. Second, it seems possible that the strengths of both orientations might be merged to support technology education programs that address both concrete, practical technical skills development while at the same time allowing students to develop problem-solving, analyzing, and reasoning skills. This approach may be more successful if students address problem solving as it relates to critical technologies as determined by substantiated technology needs (Office of Science and Technology Policy, 1995) and less on the random choices of instruction that are currently being implemented in many technology education programs.

A question not addressed in the present study is whether the personality type preferences of students in industrial arts or technology education programs are similar or dissimilar to the preferences held by teachers. A need exists to determine whether students are attracted to these programs because of their personality preference or if the program gradually influences their perceptions and psychological preferences. In any event, results of this study do have ramifications for student recruitment and interaction in teacher training programs. Educators should be aware that students type preferences may differ from the predominant types found for industrial arts or technology education. Thus, all technology educators, regardless of professional orientation should be aware of the potential impact that psychological type preference may have on orientation toward learning. It seems that educators might be aware of student differences and adopt methods that address the needs and concerns of all students, regardless of preferences, through curricular orientation and classroom activities.

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The limits of using psychological type preferences for understanding one's personal and professional orientation must be recognized. Rojewski and Holder (1990) cautioned that "a tendency may exist to categorize or stereotype students based on reported MBTI preferences without regard for the individual" (p. 89). Instead, psychological type should be viewed as an individual's preferred style of approaching and dealing with the world. As such, this data should not be used as an excuse or justification for the superiority of one program over another, or as a way to eliminate or discourage students from programs when they do not meet prescribed personality profiles. A better understanding of personality preferences can lead to a greater appreciation of professional differences and individual student learning needs, as well as create an opportunity for educators to ensure that an optimal learning environment is provided.

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